Claims

1. A vehicular rotating electrical machine apparatus comprising:

a rotating electrical machine which includes a rotor having a field winding, and a stator disposed at an outer periphery of the rotor and having a stator winding, and performs electric power generation and starting; and

an inverter unit which converts DC power of a battery into AC power at a time of a starting motor operation of the rotating electrical machine and supplies it to the stator winding, and converts AC power generated in the stator winding into DC power at a time of a generator operation of the rotating electrical machine and charges the battery, wherein

the inverter unit is integrally mounted to the rotating electrical machine and is electrically connected to the stator winding,

the rotor includes a rotor iron core which includes a magnetic part where adjacent magnetic poles are formed to have different polarities, and a field winding, and a permanent magnet which is disposed between the adjacent magnetic poles and supplies, together with the field winding, magnetic flux to the stator iron core, and

the magnetic flux by the permanent magnet is adjusted so that in an actual use rotation speed range of the rotating

electrical machine, a deenergization no-load induced voltage or a deenergization induced voltage in a minimum electric load power generation state does not exceed a voltage of the battery.

2. A vehicular rotating electrical machine apparatus according to claim 1, characterized in that the rotor is a claw-pole type rotor, and the permanent magnet includes a pair of permanent magnets interposed between pawl-shaped magnetic pole parts of the rotor.

3. A vehicular rotating electrical machine apparatus according to claim 1, characterized in that the inverter unit is integrally mounted on an end face of the rotating electrical machine in an axial direction.

4. A vehicular rotating electrical machine apparatus according to claim 1, characterized in that the inverter unit is integrally mounted on a surface of the rotating electrical machine in a radial direction.

5. A vehicular rotating electrical machine apparatus according to any one of claims 1 to 4, characterized in that the rotating electrical machine includes a cooling fan, and cooling is made by cooling air thereof in order of the inverter unit, the rotor, and the stator.

6. A vehicular rotating electrical machine apparatus according to any one of claims 1 to 5, characterized in that the stator winding includes a rectangular wire or a stator coil arrayed or shaped into a rectangular shape.

7. A vehicular rotating electrical machine apparatus according to claim 6, characterized in that a sectional shape of a coil turn part of the stator winding is round.